Ham-Space Digest              Sun,  7 Aug 94      Volume 94 : Issue  217


Today's Topics:
            GPS base stations in Scranton PA area? (2 msgs)
                    GPS Freq and antenna questions
                          HELP NOAA Series
                  Low-band Satellite transponders?
                              MacSPOC
                    MacSPOC updates (2 msgs)
                  STS-65 Commemorative TLI Burn
                What SAT's can I hear on a Scanner ?

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party.  Your mileage may vary.  So there.
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Date: 5 Aug 1994 23:52:41 -0400
From: panix!not-for-mail@uunet.uu.net
Subject: GPS base stations in Scranton PA area?
To: ham-space@ucsd.edu

In <oiEbZxa00WB6BAu24y@andrew.cmu.edu> Ergin Guney <eg23+@andrew.cmu.edu> writes:

>Excerpts from netnews.rec.radio.amateur.space: 4-Aug-94 GPS base
>stations in Scrant.. by George Brown@partech.com
>> Is anyone aware of any GPS base stations in the Scranton PA area?  We have
>> some survey work and are contemplating using a GPS receiver (need
>> differential for better accuracy) to support the effort.  We would like to
>> know if there is a base station near, accuracy, cost of access, etc.  Or
>> is there another alternative that would give 1-2m accuracy in real-time?
>> Any help would be appreciated.

>Either you have been misinformed, or I am missing something big. I
>pretty well know that GPS signals aren't transmitted by any "base
>stations" on land. They come from 12 or so satellites that are circling
>the earth on low polar orbits. The receiver works by receiving the
>signals from any three of these satellites at a given moment (which is
>guaranteed on any point on the earth, due to the orbital configuration
>of the satellites). Therefore, you don't have to worry about access to
>GPS signals no matter where you are; New York City or Tibet doesn't make
>any difference.

Well, actually about 24 satellites, but your general point is correct.


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Carl Oppedahl AA2KW
Oppedahl & Larson (patent lawyers)
Yorktown Heights, NY
oppedahl@patents.com

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Date: Sat, 6 Aug 1994 15:14:04 GMT
From: ihnp4.ucsd.edu!news.cerf.net!mvb.saic.com!MathWorks.Com!
europa.eng.gtefsd.com!gatech!wa4mei!ke4zv!gary@network.ucsd.edu
Subject: GPS base stations in Scranton PA area?
To: ham-space@ucsd.edu

In article <oiEbZxa00WB6BAu24y@andrew.cmu.edu> Ergin Guney <eg23+@andrew.cmu.edu>
writes:
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>guaranteed on any point on the earth, due to the orbital configuration
>of the satellites). Therefore, you don't have to worry about access to
>GPS signals no matter where you are; New York City or Tibet doesn't make

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>any difference.
>
>Unless you're talking about some other GPS ("General Pinpointing
>Service"? :) ) or a special land-based factor about GPS signals that I
>wasn't aware of (like what you mean by "differential"), I am pretty sure
>that what I have explained here is accurate.
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You're missing something pretty big. Differential GPS is the system
whereby a GPS receiver at a known geographical benchmark continously
broadcasts it's position via radio. Receivers in the field then
combine the offset from known position reported by the benchmark
receiver with their current satellite reported position to defeat
the SA scatter deliberately introduced into the GPS satellite
system by the military. Most GPS receiver manufacturers, like Garmin
and Trimble, support differential GPS operation in their newer units.

Benchmark transmissions are becoming more common. Some (sponsored
by the FAA) are on commercial FM broadcast subcarriers, and others
are on land mobile, marine, or amateur frequencies. The FAA and the
Coast Guard are cooperating in setting up this system of benchmark
receivers so that precision aircraft and boat navigation under zero-zero
visibility conditions can be done. Some amateurs are also setting
up benchmark systems for amateur navigation experiments. Instead
of the typical civilian GPS navigational position uncertainty of
100 meters, differential GPS can offer position information accurate
to a few centimeters. This is vital for zero-zero capability since
few runways are over 100 meters wide. It's also vital in some shipping
channels, for precision mapping, and for positioning of equipment
such as offshore drill rigs. And it's obviously necessary for land
vehicle navigation since most roadways are only 18 feet wide and
lanes are only 9 feet wide. Errors of 100 meters are unacceptable.

Gary
--
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Gary Coffman KE4ZV          |    You make it,     | gatech!wa4mei!ke4zv!gary
Destructive Testing Systems |    we break it.     | uunet!rsiatl!ke4zv!gary
534 Shannon Way             |    Guaranteed!      | emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244     |                     |
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Excerpts from netnews.rec.radio.amateur.space: 4-Aug-94 GPS Freq and
antenna questions by Gary Delong@ctron.com
> The questions: What freq range(s) do the GPS transmiters use?
> and, is there anything "special" in the antennas made for
> use with this units? ( circular pol? )

Here is the only GPS frequency information that I have on hand. This is
from a public domain frequency list named Scanner Searchers Guide by
N5OWK dated January 1990, which I downloaded from this newsgroup or a
similar one:

        1575.42 MHz is the Navstar Global Positioning System (GPS)
        frequency L1, and 1227.6 MHz is L2.

That's all it says. I hope this helps a little. But I won't be able to
help you about the antenna at all, I'm afraid.


Ergin Guney

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Date: Fri, 5 Aug 1994 00:06:50 GMT
From: ihnp4.ucsd.edu!agate!howland.reston.ans.net!torn!nott!cunews!
freenet.carleton.ca!FreeNet.Carleton.CA!ag381@network.ucsd.edu
Subject: HELP NOAA Series
To: ham-space@ucsd.edu

Where can I find data on what these sats transmit ?I mean formal data useful
for IR calibration and any other data such as perhaps telemetry data.
Please post response and thanks in advance!

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Date: Fri,  5 Aug 94 14:48:01 GMT
From: paperboy.ids.net!usenet@uunet.uu.net
Subject: Low-band Satellite transponders?
To: ham-space@ucsd.edu

The Russian RS-10/11 and RS-12/13 satellites use 10 meter
transceivers.  A good description is in the "How to Use
the Amateur Radio Satellites" booklet which I mentioned in
a previous post.

Philip Chien
no sig yet

In Article <CtyzFr.Hqy@usenet.ucs.indiana.edu>

brandtk@silver.ucs.indiana.edu (Keith E. Brandt, MD) writes:
>I have heard there are two amateur satellites that work entirely on the low-
>bands (10 and 15 meters?). I would appreciate it if someone would let me know
>which satellites and what the passbands are. If there is an archive somewhere
>with this info, a pointer would be appreciated.
>
>Thanks,
>Keith
>
>
>=========================================================================
>Keith E. Brandt, MD, WD9GET      ||  Goodbye, cruel world that was my home-
> New Castle Family Physicians    ||     there's cleaner space out here to roam.
> New Castle, Indiana             ||  Put my feet up on the moons of Mars-
>brandtk@silver.ucs.indiana.edu   ||     sit back, relax, and count the stars.
>=========================================================================

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Date: Sat,  6 Aug 94 19:38:37 GMT
From: paperboy.ids.net!usenet@uunet.uu.net
Subject: MacSPOC
To: ham-space@ucsd.edu

MacSPOC is an incredible program.  I've used many versions up
through version 1.5 and it's got features unavailable
in any other satellite tracking program I've seen.  You can
input in an entire set of shuttle maneuvers, attitudes and burns
and macSpoc will tell you where the shuttle will end up - and
where it will be pointing!  The program gives you a view out
the window showing you where each window is pointed on the Earth's
surface, and a simulated view which corresponds to the actual
fieled of view out of the astronaut's window.  On extremely useful
feature for SAREX enthusiasts is the determinating of the point on
the Earth's surface where the shuttle's SAREX antenna is pointing.
For photography buffs the database include recommended shutter
settings for different earth obs targets.

The primary input for keplerian elements is in the M50 format, but
Dan has also added the capability to accept two line elements from
the standard Amsat format.  One of the key features it is missing
though is the capability to select a satellite from a text file of
keps.

The key limitation to MacSPOC is that it's so specifically designed
for use by an astronaut in space (or a payload officer of flight
dynamic officer on the ground) that it's fairly difficult to use -
unless you're heavily into the shuttle program.

In any case it's extremely impressive, and the shareware version
is certainly worth looking at, even though it's an earlier version.

How often can you say that you've tried software which has actually
been used aboard the shuttle?

Philip Chien KC4YER
no sig yet - and yes I'm just a satisifed user without any financial
interest in MacSPOC or Dan Adamo.

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If there is enough of a desire to have them posted... I will post Dan
Adamo's MacSPOC updates for the Shuttle missions as soon as they become
available.

Here is the skinny of the Mac program from the AOL files description:

*** MacSPOC Info ***

Welcome to an enhanced awareness of satellites in earth orbit!  MacSPOC
(SPOC = Spacecraft Personal Orbit Computations) v1.5 is a commercial real
time satellite trajectory display.  Previous MacSPOC versions were
evaluated by orbiting astronauts during the STS-41, STS-43, and STS-52
missions.  MacSPOC continues to be used in control centers and schools
across the country.  The MacSPOCl v1.5 configuration regularly supports
Mission Control planning for the Shuttle Amateur Radio Experiment (SAREX)
program.  A v1.1 package is available for downloading from AOL.  It's
similar to the MacSPOC version flown aboard STS-41 and is copyrighted
freeware for you to "test drive".

By downloading your MacSPOC test drive, you agree to two restrictions.
First, you may not disassemble or modify MacSPOC code.  Second, although
you may produce unlimited copies of your download, it may not be
distributed to others for any fee or compensation.

Real world MacSPOC trajectory updates, called checkpoints, are uploaded
during Space Shuttle missions and upon request.  Because they're only
about 500 bytes in size, checkpoints are easy to send and receive.  To
obtain free checkpoints, send your e-mail address via AOL to "AdamoD".  If
you'd also like to receive a free MacSPOC v1.5 brochure, include your name
and mailing address too.

Two functionally identical MacSPOC v1.1 download packages are available to
support various Macintosh models.  Choose the "MacSPOCfpu.sit" package
only if your Macintosh has a 6888x FPU (math co-processor) chip.  Other
models, including 68040-equipped machines running with cache memory OFF,
can utilize the "MacSPOC+.sit" package.  Both packages are compatible with
either System 6 or System 7.

Your MacSPOC v1.1 download consists of four parts: the MacSPOC
application, a world map bitmap file "SPOCMap", a database of STS-52 earth
observation sites "Earth Obs", and a checkpoint formatting utility called
"Convert2v1.1".  To install MacSPOC v1.1 after your download is unstuffed,
be sure at least the first three of these files reside in the same folder.

A quick hypothetical demo of MacSPOC displays can be obtained with the
following steps.  First, if a file named "MacSPOC.cp" exists in the folder
occupied by MacSPOC, delete it, rename it, or drag it elsewhere.  Next,
open (double-click) the MacSPOC application and await appearance of a
dialog box with "Edit Liftoff GMT" as its heading.  Click the "Check
SV..." button, then click the "Save" button.  A new dialog will appear,
asking "Ready to Propagate State Vector?".  Click the "Go!" button in this
dialog, and you'll be off and running.

At some point prior to tracking a real satellite like a Space Shuttle, you
should be sure your Macintosh system clock is set accurately via the
Control Panel.  Next, select "Time Zone..." from MacSPOC's "Update" menu.
Click the radio button which pertains to the time zone your system clock
is keeping, then click the "Save" button.  Unless you lose your copy of
MacSPOC, you'll need to repeat this procedure only when you change time
zones in your system clock, as when you "fall back" to standard time the
last Sunday in October.

All MacSPOC checkpoints are uploaded in v1.5 format.  After downloading,
you can translate a checkpoint to v1.1 format by using the Convert2v1.1
utility.  Just load Convert2v1.1, then use it to open the downloaded v1.5
checkpoint.  The checkpoint created by Convert2v1.1 can then be
double-clicked or opened for processing by MacSPOC v1.1.  The only
information lost during this conversion process defines maneuvers which
might be included to change the orbit originally defined in the
checkpoint.
-Dan Adamo,
MacSPOC Developer

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Date: Sat, 06 Aug 1994 08:26:33 -0500
From: europa.eng.gtefsd.com!NewsWatcher!user@uunet.uu.net
Subject: MacSPOC updates

To: ham-space@ucsd.edu

In article <31uu0e$o95@search01.news.aol.com>, tstader@aol.com (TSTADER)
wrote:


> If there is enough of a desire to have them posted... I will post Dan
> Adamo's MacSPOC updates for the Shuttle missions as soon as they become
> available.
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> information lost during this conversion process defines maneuvers which
> might be included to change the orbit originally defined in the
> checkpoint.
> -Dan Adamo,
> MacSPOC Developer


  Can this program be found anywhere else besides AOL, like maybe at some
of the popular FTP site's (ie SUMEX,UCSD,OAKLAND ) ????



*********************************************
        Keith J Leite AA1JF
   AX25 - AA1JF @ WA1PHY.#EMA.MA.USA.NA
     AMPR - aa1jf@switch.sema.ampr.org
  Internet - kleite@gtec3.ndhm.gtegsc.com

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Date: 5 Aug 1994 22:49:06 -0400
From: newstf01.cr1.aol.com!search01.news.aol.com!not-for-mail@uunet.uu.net

Subject: STS-65 Commemorative TLI Burn
To: ham-space@ucsd.edu

I am re-posting this note from a message I got on AOL. Please reply
directly to Dan Adamo at his AOL account: Adamod@aol.com

Text follows:
==================
Date:  Thu, Aug 4, 1994 7:43 PM EDT
From:  Adamod
Subj:  STS-65 Commemorative TLI Burn

File:  TLI.sit (58540 bytes)

MacSPOC Users-

During STS-65, you'll recall MacMission Control supported targeting of a
commemorative TransLunar Injection (TLI) burn.  Time of IGnition (TIG) for
this burn was 25 years to the minute after a similar TLI was performed by
Apollo-11 to break free of low earth orbit.  The commemorative TLI was
tageted to reach a point 100 miles above the moon's farside 25 years to
the minute after Apollo-11's Lunar Orbit Insertion (LOI) burn TIG.

With targets from MacMission Control, Flight Dynamics Officers (FDOs) in
the real Mission Control filled out a Pre-Advisory Data (PAD) for the
commemorative TLI burn.  This PAD, together with plots of STS-65's
post-TLI trajectory relative to the earth and moon, are enclosed as 3
TeachText documents for your viewing pleasure.

An image of the commemorative TLI PAD was uplinked as a FAX to the STS-65
crew around 8:30 AM CDT July 16, 25 years after Apollo-11 was launched.
Upon receiving the PAD, STS-65 Commander Bob Cabana remarked, "Don't we
wish!"  Powered Explicit Guidance mode 7 (PEG 7) targets computed by
MacMission Control appear on the PAD as an in-track speed increase of
9586.3 fps, a northward cross-track velocity change of 3073.7 fps, and a
radial upward velocity change of 5944.0 fps.  Using both Orbital
Maneuvering System (OMS) engines for a total thrust of 12000 lbs, Columbia
would have required a TLI burn duration (TGO) of 2 hrs 03 min 24 sec to
build up these velocity changes.  Actual OMS fuel available to Columbia at
TLI TIG would have supported less than 5 min of 2-engine burn time, and
most of this was allocated to STS-65 deorbit.

It's worth noting Apollo-11 weighed nearly 200000 lbs at TLI TIG, only
about 45000 lbs less than Columbia's WT on the commemorative PAD.  Unlike
Columbia, however, about 75% of Apollo-11's weight was propellant to feed
the Saturn IV-B's single J-2 engine during TLI.  Because the J-2 developed
about 200000 lbs of thrust, Apollo-11's TLI required less than 6 min to
perform.

The 2 post-TLI plots are in the ecliptic plane.  This is coincident with
earth's orbit around the sun.  The moon's orbit about earth is less than 5
deg from the ecliptic.  The Vernal Equinox indicated on these plots is the
Sun's apparent position as viewed from earth when Spring begins in March.
The Sun's position in mid-July is also indicated on the plots.

Does anyone have a guess as to when the next (manned) TLI burn will be
performed for real?

-Dan Adamo
====================
a file was attached which I will be glad to BinHex and e-mail to anyone
that would like it.

73 for now.... c u on the shortwaves
Terry Stader - KA8SCP
America Online Ham Radio Club Host
Internet: tstader@aol.com (files <28K)  or
          p00489@psilink.com ( files >28K)
KA8SCP@WA1PHY.#EMA.MA.USA.NOAM

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Date: 6 Aug 1994 06:23:03 -0400
From: newstf01.cr1.aol.com!search01.news.aol.com!not-for-mail@uunet.uu.net
Subject: What SAT's can I hear on a Scanner ?
To: ham-space@ucsd.edu

In article <2t2qdt$dih@freenet3.scri.fsu.edu>, bmm1@freenet3.scri.fsu.edu
(Bruce M. Marshall) writes:

Do you ever run packet? Or catch weather pics? I'm working on the no code
right now and would like input on the above subjects.
Thanks.
73
John

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End of Ham-Space Digest V94 #217
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